Scissor Dock Lift BTAD Portable Loading Dock

Installation, Operation and Service Manual

BEACON™

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General Information

The BTAD series of Lifts have been primarily designed for loading dock applications. The most important advantages of BEACON Scissor Dock Lifts is that they are infinitely adjustable. The installation of this Lift provides full flexibility, allowing you to load and unload at any truck bed elevation.

All BTAD models are similar in design but differ in capacity and platform sizes. This manual is intended to familiarize you with installation, operation and service procedures.

Model Number and Capacities

The model number, serial number and capacities are stamped on the nameplate. Please remember to include these numbers in any correspondence with your dealer or the factory.

Loading

The load capacity rating as stamped on the nameplate of your Lift designates the net capacity, assuming uniformly distributed load. This capacity must never be exceeded, as permanent damage may result. The relief valve has been preset to raise the indicated capacity plus an overload. Lowering loads exceeding the rated capacity can result in excessive wear or damage to the Lift.

Axle Load Ratings

The maximum axle loads that the Lift is designed to take over its sides and ends is stamped on the nameplate.

Suggestions and Criticism

BEACON is a company which puts great stress on constructive ideas or criticism. Your suggestions, as end users of BEACON equipment, may result in research and development which will enable us to produce an even better product. We would appreciate hearing your ideas.

Receiving Instructions

Every BTAD Portable Loading Dock is thoroughly tested and inspected prior to shipment. However, it is possible that the unit may incur damage during transit. Remove all packing and strapping material and inspect for damage. IF DAMAGE IS EVIDENT, FILE A CLAIM WITH THE CARRIER IMMEDIATELY. Also, check the platform size, type of power unit, etc., to see that the unit is correct for the intended application.

General Layout, Transfer Arrangements, and Specifications

Figure 1 shows a general layout for a typical BTAD series with the standard transfer arrangement. Figure 2 shows some of the alternate transfer arrangements. Figure 3 gives an idea of different application possibilities. The major specifications of the BTAD Series are listed below according to model numbers.

Installation

1. Remove all steel strapping and the wooden skid. The unit comes with four (4) eye bolts fitted on the platform (See Figure 15, Item 16). These are to be used for lifting the unit with a crane or fork truck.
2. Remove the 2 shipping bolts (Figure 15, Item 18 and 20).
3. The weather proof UP/DN Push button Station with 10' coil cord and a detachable disconnect plug is packed separately in a small box. Make sure you have received the same. Attach the plug to the receptacle provided on the side of the power unit housing. (See Figure 1 for actual position.)
4. The unit is supplied completely prewired along with a 15' long power cord and a twist lock plug. The twist lock plug will have 3 or 4 prongs depending on the power supply for which the BTAD is wired. A decal indicating the "Power Supply", is stuck on the side of the power unit housing where the power cord comes out of it. Read the voltage and phase and check if you have the same power supply source. Please refer to the Electrical Section in this manual for the correct mating receptacle required to be purchased and installed by the purchaser of our equipment. Now attach the power plug and turn "ON" the electrical power at the fused disconnect switch (if provided, at your end). The lift is now ready for initial testing.
5. Press "UP" button. The unit will elevate. On releasing the "UP" button the platform will remain stationary. Press the "DN" button. The platform will descend.
6. Raise and lower unit several times for the full stroke. Check leakages which may occur due to hydraulic connections loosened during shipment.
7. Raise the unit to the top, and insert the (2) Maintenance Service Angles in position. (See Figure 1 for location). Lower the unit until the bottom rollers touch the Maintenance Safety Angle. Now check the underside of the platform, legs etc. for any damage during shipment.
8. Lower the platform after removing the maintenance safety angles. Remove the front panel. Check the oil level in the reservoir to ensure there have been no spillages during shipment. Top off if necessary. (See "Oil Viscosity Recommendations" in this manual.)
9. Check the portability features as explained elsewhere in this manual.
10. The unit is now ready for normal operation.

Operation

The BTAD models are furnished with constant pressure ("dead-man" type) push button controls. Depressing the "UP" (or RAISE) control, starts the motor, (see wiring diagram) which in turn runs the hydraulic pump. The cylinders begin to extend and the platform starts to raise. The platform will rise as long as the "UP" control is depressed. On releasing the control, the platform ceases to rise and will remain at that particular elevation. This is because the motor circuit is broken and the motor stops running.

On depressing the "DOWN" (or LOWER) control, the Down Solenoid Valve is energized. The cylinders start retracting as the oil returns to the reservoir and, upon releasing the control, the platform ceases to lower, remaining at that particular elevation.

In the event that the Lift is overloaded, the relief valve will open because of excessive pressure build up, and oil will bypass into the reservoir. When the Lift reaches a preset vertical travel (55" on standard models) the "Up Limit Switch" will be actuated. This shuts off the power to the motor. When in this condition, depressing the "UP" button will have no effect. The platform will remain stationary at this elevation.

Always remember that the motor runs only when the "UP" button is depressed and the Down Solenoid Valve is energized only when the "DOWN" button is depressed.

Model Number	Capacity	Axle Capacity Ends or Slides	Platform Width	Platform Length	Lowered Height	Travel	Raised Height	Approx. Up Speed f.p.m.	Motor HP	Num of Cyinders	Approx Ship Weight
BTAD-30-606	3000 lbs.	1500 lbs.	72"	72"	5"	55"	60"	6	1-1/2	2	2500 lbs.
BTAD-40-606	4000 lbs.	2000 lbs.	72"	72"	5"	55"	60"	6	1-1/2	2	2525 lbs.
BTAD-50-606	5000 lbs.	2500 lbs.	72"	72"	5"	55"	60"	6	1-1/2	2	2550 lbs.
BTAD-60-606	6000 lbs.	3000 lbs.	72"	72"	5"	55"	60"	6	1-1/2	2	2550 lbs.
BTAD-30-608	3000 lbs.	1500 lbs.	72"	96"	5"	55"	60"	5	1-1/2	3	2700 lbs.
BTAD-40-608	4000 lbs.	2000 lbs.	72"	96"	5"	55"	60"	5	1-1/2	3	2725 lbs.
BTAD-50-608	5000 lbs.	2500 lbs.	72"	96"	5"	55"	60"	5	1-1/2	3	2750 lbs.
BTAD-60-608	6000 lbs.	3000 lbs.	72"	96"	5"	55"	60"	5	1-1/2	3	2850 lbs.
***BTAD-30-806**	3000 lbs.	1500 lbs.	96"	72"	5"	55"	60"	5	1-1/2	3	3000 lbs.
***BTAD-40-806**	4000 lbs.	2000 lbs.	96"	72"	5"	55"	60"	5	1-1/2	3	3025 lbs.
***BTAD-50-806**	5000 lbs.	2500 lbs.	96"	72"	5"	55"	60"	5	1-1/2	3	3050 lbs.
***BTAD-60-806**	6000 lbs.	3000 lbs.	96"	72"	5"	55"	60"	5	1-1/2	3	3150 lbs.

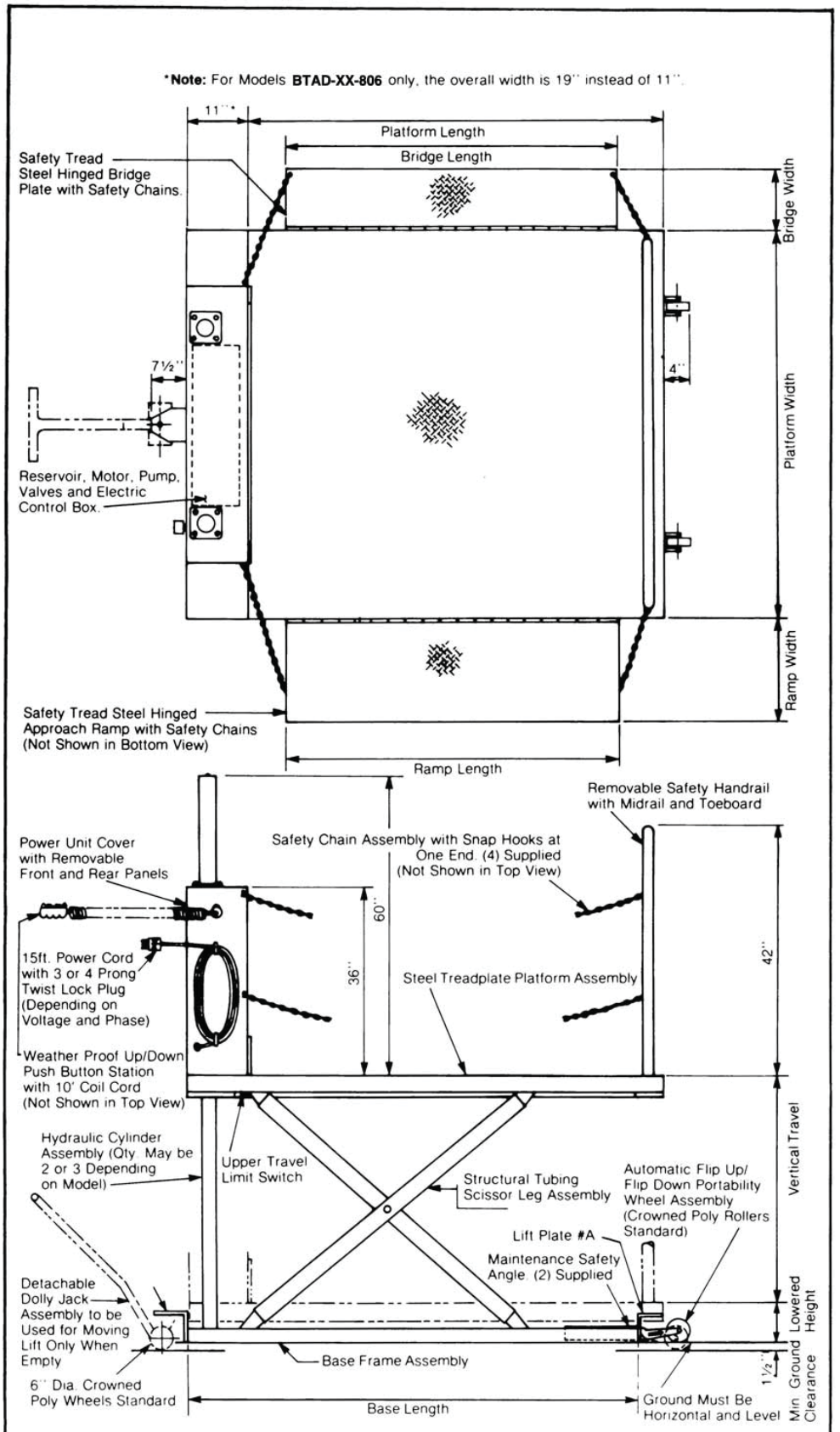


Figure 1
Typical Layout if "BTAD" Series with Standard Transfer Arrangement

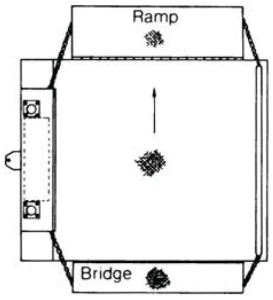


Figure 2A

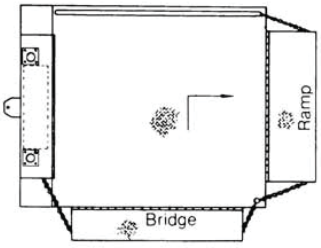


Figure 2B

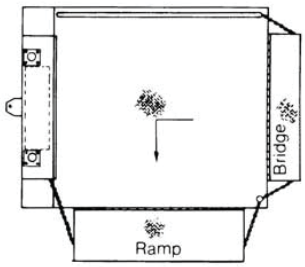


Figure 2C

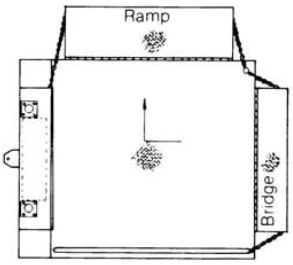


Figure 2D

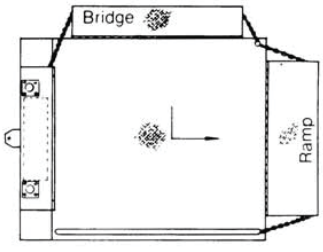


Figure 2E

Figure 2
Alternate Transfer Arrangements

Portability Feature:

The BTAD Series is a portable model. Figure 1 shows the position of the lift plates A and B. A more detailed view of these plates is shown in Figure 5. Moving or stabilizing the unit is achieved as follows.

To Move The Unit:

a) Position dolly jack tow-bar under the lift plate #A and raise. The flipup/ flip-down wheels will automatically lower and lock in the mobile position.

b) Now place dolly jack tow-bar under lift place #B the unit is now ready to be moved.

To Stabilize The Unit:

a) Remove tow-bar from under the lift plate #B and position the same under lift plate #A. Raise. The wheels will automatically raise.

b) Lower dolly jack.

Caution:

Do not load the unit when in mobile position or attempt to move while loaded.

Routine Maintenance

Raise the Lift and install the Maintenance Safety Bars before beginning any inspection or work on the unit.

(A) Monthly Inspections

1. Check oil level. It should be 1" below top of the tank with Lift in fully lowered position. Add as necessary. (See oil specifications.)
2. Check for oil leaks. See Trouble Shooting Section and correct as necessary.
3. Check roller bushings, axle pin, clevis and pivot points for wear.
4. Check for worn or damaged hydraulic hoses or electrical cords. Repair as necessary.
5. Check rollers for looseness and wear. See Trouble Shooting.
6. Check retaining rings at all axles, pivot points and clevis.
7. Never grease rollers or axles as they are lubricated for life.
8. Check for unusual noise. See Trouble Shooting.

(B) Yearly inspection

Oil in reservoir should be changed at least once a year, or sooner if the oil darkens or becomes gritty. Presence of water is indicated if the oil turns milky.

(C) Winter/Summer Maintenance

Change the oil as per 'Oil Viscosity Recommendations' depending on the ambient temperatures prevailing in your area.

Some "Tips" to the Operator

1. Always load the Lift properly, centering the load on the platform as much as possible.
2. Never use the Lift if it is in need of repairs or in the case of a malfunction.
3. Notify your maintenance personnel in case you notice anything out of the ordinary, such as binding, odd pump noises, etc.
4. Do not continue to depress the "UP" control if the Lift is not raising. You can permanently damage the motor or pump by doing so.
5. **Important:** Do not load the unit when in mobile position or attempt to move while loaded.
6. For proper operation of the unit, make sure ground is level and horizontal.

Oil Viscosity Recommendations

Best performance can be obtained by utilizing ISO-Vg grade 32, 46 oil with a viscosity range between 150-250 SUS at 100°F (32-54 cST a 40°C). Minimum viscosity at operating temperature is 60 SUS (10cSt). Maximum start-up viscosity at minimum ambient temperature of hydraulic oil is 150°F (65°C).

Oil should be non-corrosive, have maximum anti-wear properties, rust and oxidation (treatment), and be non-foaming.

Recommended list of oils for an ambient temperature range of - 10°F to + 100°F (- 23°C to + 38°C) are as follows:

1. Amoco Oil Co.	Rycon Oil No. 32, 46
2. Cities Service Oil Co.	Citgo AW Hyd. Oil 32, 46 Citgo All Temp. Hyd. Oil
3. Chevron USA	Chevron EP Hyd. Oil 32, 46
4. Fina Oil Co.	Fina AW 32, 46 Fina Automatic Transmission Fluid Dexon II
5. Gulf Oil Corporation	Gulf Harmony 32 AW 32, 46
6. Mobil Oil Corporation	DTE 15, 24, 25 Mobile Fluid #300 transmission Fluid
7. Sentinel Lubricants Corp.	Sentinel SH-10 Hydraulic Oil
8. Shell Oil Corp.	Tellus Hyd. Oil 32, 46 Tellus "T" Hyd. Oil 32, 46
9. Texaco Inc.	Rando Oil Hd-32, 46
10. Union 76	XCell AW 46 (200)

Notes:

1. **Do Not Use Brake Fluid.**
2. All BTAD's requiring oil by BEACON will be supplied with AW-46(200) Hydraulic oil.
3. BEACON strongly recommends the use of an oil immersion heater when units are mounted outside or when ambient temperature is expected to fall below 40°F.
4. In case an oil heater is used on your lift, refer to temperature settings given under oil immersion heater section in "Options".

Options, Attachments and Accessories

Some of the more common options and attachments are given below.

A. Oil Immersion Heater

An oil immersion heater with thermostat control (specs: 250 Watts, 115v/208-240V/1PH/60Hz) is available as an optional accessory. BEACON strongly recommends the use of this accessory when units are mounted outside and/or when ambient temperature is expected to fall below 40°F. The heater has an adjustable thermostat control. However, care should be exercised by the customer in setting the temperature so that the viscosity of oil does not drop below 200 SUS at the elevated temperature. This will ensure a trouble free running of the power unit. Also, customer should turn the heater off during the summer months of when the ambient temperature is above 65°F.

Caution:

Units equipped with an oil immersion heater should not exceed the following temperature settings:

Grade of Oil Used	Oil Viscosity Rating	Max. Allowable Temp. Setting of Oil Immersion Heater
ISO-Vg32	150 SUS @ 100 ° F	90 °F
ISO-Vg 46	250 SUS @ 100 °F	110 °F
SAE 10 W 30	400 SUS @ 100 °F	130 °F
SAE 40	750 SUS @ 100 °F	150 °F

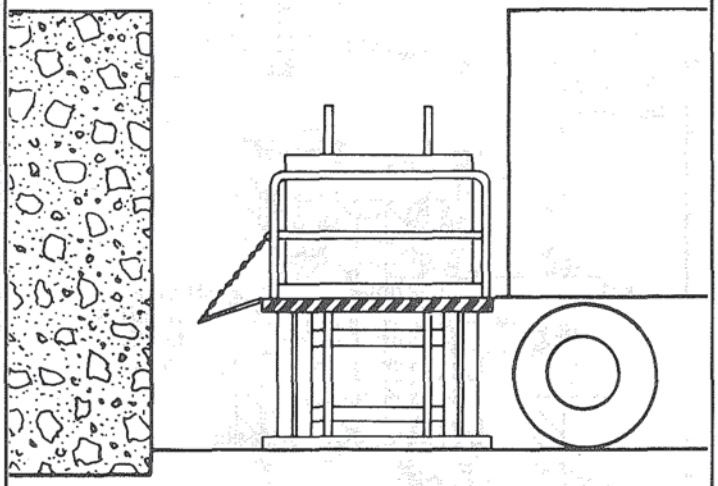
B. Flashing Red Light

A 24VDC flashing red light is available for added safety. When the "UP" pushbutton is depressed the first time the light will start flashing and continue to flash indefinitely. The platform may be raised, lowered or remain stationary during this time. To turn the light off, depress the stop button located on the base of the flashing red light.

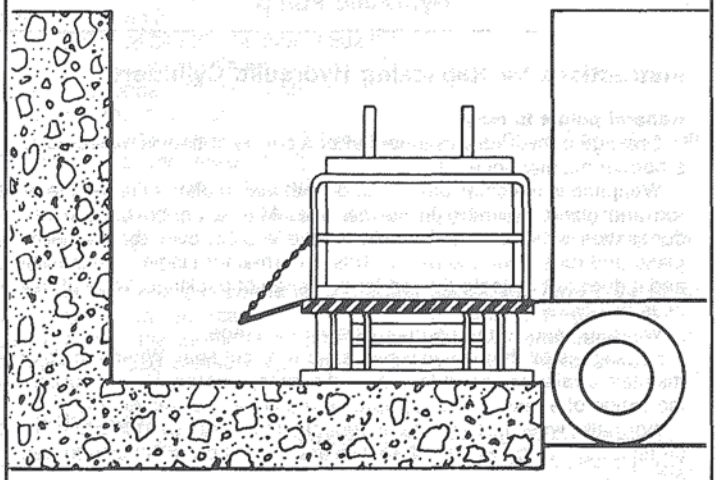
C. Warning Bell

A 24 VAC warning bell is available as an optional accessory for added safety. The bell sounds for a few seconds on the start of the "UP" and "DN" cycles. The length of time for the bell to sound is factory adjusted to 2 seconds. However, this timing can be easily varied from 1 to 10 seconds by adjusting the knob on the timer relay located inside the control box.

Locate it in front of a door.



Place it on top of a low dock.



Position it in front of a raised dock.

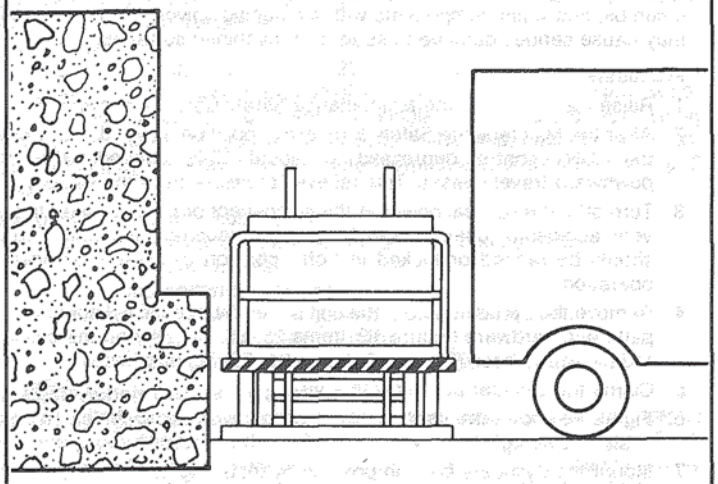


Figure 3
Trans-A-Dok has Unlimited Application Posibilities

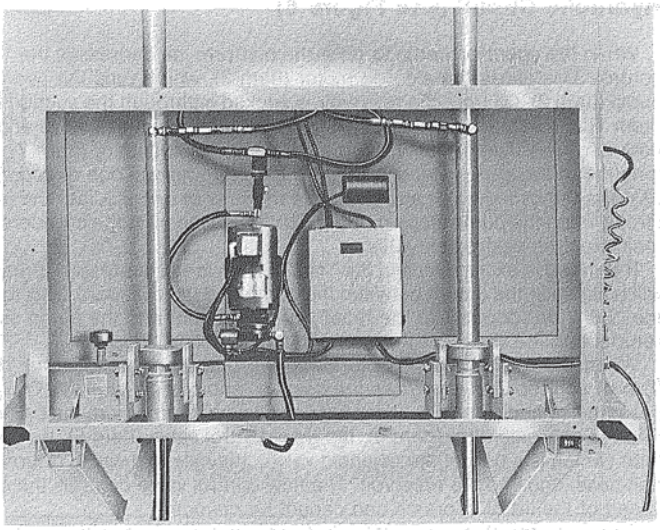
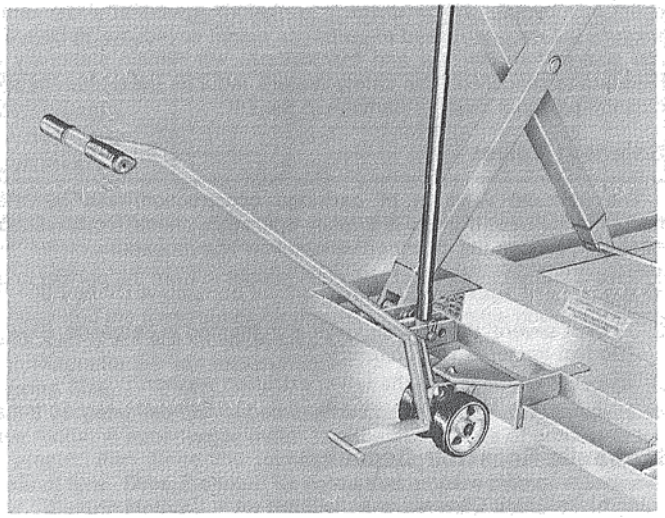
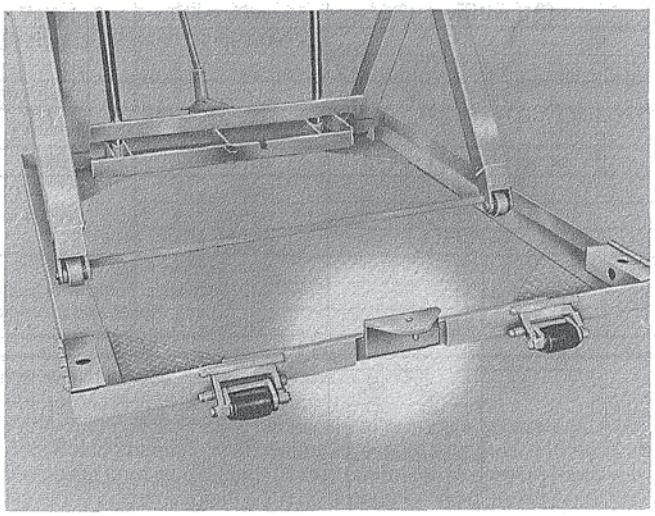


Figure 4 A View of the Trans-A-Dok™ Power Unit



To Stabilize:
Place Dolly Jack Tow Bar at the rear lift plate and raise. Roller catch automatically releases, lowering the unit onto the base from. BTAD is now ready for operation.



To Relocate:
Position Dolly Jack Tow Bar under the rear lift plate, raise. The Flip-up/Flip down Wheels will automatically lower and lock in mobile position. Then, place tow bar under front lift plate and move to next location. **Important:** Do not load BTAD when in the mobile position or attempt to move while loaded

Figure 5 Portability Feature

Hydraulic Circuit (see Figure 6)

When the operator wants to raise the platform, he depresses the “UP” control. This starts the electric motor (Item 3), which runs the hydraulic pump (Item 2). Oil from the reservoir is sucked in through the suction filter (Item 1) and into the pump. The oil flows through the check valve and the flow control valves (Item 9) before entering the cylinders (Item 7). The function of the check valve is to allow the oil to flow in one direction i.e. towards the cylinders. It also prevents the flow of oil back into the pump circuit when the pump stops running. This holds the oil in the cylinders and maintains the desired elevation.

If the load is excessive, and the “UP” button is still depressed, pressure will build up in the circuit between the pump and the cylinders. This forces the “ball” or “poppet” in the relief valve to unseat and the pump output returns into the reservoir through the same suction hose.

When the operator desires to lower the Lift, he depresses the “DN” (Down) control. This energizes the down solenoid valve (Item 4). The poppet in the solenoid valve is unseated and oil now returns from the cylinders through micronic filter (Item 6), the flow control valve (Item 5), the return filter (which is a part of the solenoid valve), the solenoid valve, return/suction hose, and into the reservoir. The flow control valve controls the down speed of the lift. It is preset and cannot be changed.

Releasing the “DN” control will de-energize the solenoid, closing the valve poppet. This prevents the oil from returning to the reservoir and the cylinders will stop retracting. The Lift is now maintained at that particular elevation.

There is a Velocity Fuse (Item 8) at the base of each cylinder. In the event of a hydraulic hose failure, the platform lowers at a fast rate. As soon as the descent speed exceeds the preset speed, the Velocity Fuse will shut off the oil flow and the platform will remain stationary until pressure is reapplied. This safety feature reduces the possibility of accidental personal injury or damage to the Lift.

Solenoid Valve:

The solenoid valve is of cartridge construction, and is virtually maintenance-free. If there is a faulty operation, check Trouble Shooting Section. To clean the cartridge valve follow this procedure:

1. Use a sharp blunt object and push poppet in from the bottom to open the valve.
2. Repeat several times while valve is immersed in kerosene. Blow dry. (Do Not Immerse The Coil).
3. Inspect “0” rings and the teflon extrusion washer.
4. Reinstall. The valve should be tightened to approximately 30 ft-lbs.

Hydraulic Reservoir Capacity:

Integral Reservoir Capacity is as follows:
a) 6’ wide models: 3-3/4 gallons (approx.)
b) 8’ wide models: 5 gallons (approx.)

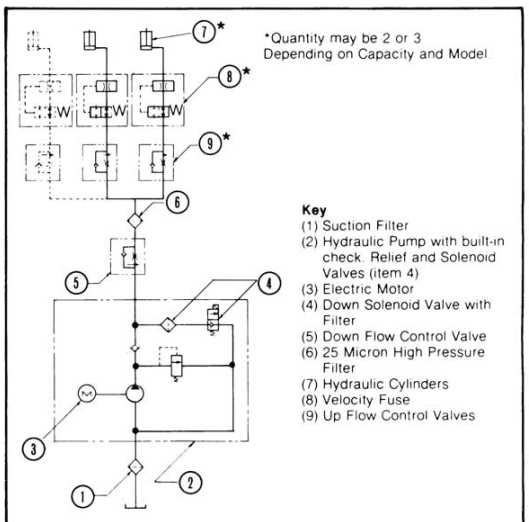

*Quantity may be 2 or 3 Depending on Capacity and Model
Key
(1) Suction Filter
(2) Hydraulic Pump with built-in check. Relief and Solenoid Valves (item 4)
(3) Electric Motor
(4) Down Solenoid Valve with Filter
(5) Down Flow Control Valve
(6) 25 Micron High Pressure Filter
(7) Hydraulic Cylinders
(8) Velocity Fuse
(9) Up Flow Control Valves

Figure 6 Hydraulic Schematic

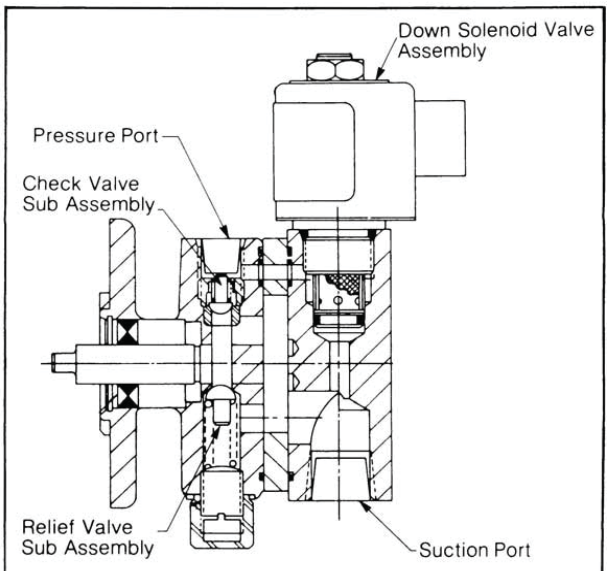


Figure 7 Cross-Sectional view of Hydraulic Pump

Instructions for Repacking Hydraulic Cylinders

General points to note:

Leakage of hydraulic cylinders after a period of time is expected and is a normal maintenance function.

Weepage is the small amount of oil that accumulates around the piston rod and gland assembly in normal use. After a period of time the accumulation increases to the point where it spills over the flange of the gland and runs down the barrel. This is normal for single acting cylinders and it does not indicate a need for a change of packings. Wipe off the excess oil occasionally.

Weepage should not be confused with leakage.

Leakage is oil that is bypassing a worn or cut seal. When Lift does not maintain a raised position for a period of time, (approx. 1/2-1hour), it is an indication of a leak. These symptoms require a seal replacement.

Normally, when one cylinder is repacked the other cylinders should also be repacked, since when one seal wears out, the other is close to wearing out.

Caution: As is well known, dirt and foreign material are the worst enemies of hydraulic systems and hence precautions should be taken to prevent contamination of the system through open f fittings, pipes, or disassembled components.

In the event of accidental contamination, flush pipes and hoses with clean oil, and wash components with a cleaning solvent. Failure to do so may cause serious damage to seals and machined surfaces.

Procedure:

1. Raise the Lift, insert the Maintenance Safety Bars, as shown in Fig. 1.
2. After the Maintenance Safety Bars are in position, lower the Lift. Keep the “DN” control depressed for about 15-20 seconds after the downward travel ceases. This relieves pressure from the system.
3. Turn off the electrical power at the disconnect or ciruit breaker to prevent accidental operation while you are repairing the unit. Switch should be tagged or locked in “off” position to prevent accidental operation.
4. Remove the cylinder(s) from the unit by removal of the cylinder holding plate and hardware (Figure 15; Items 25, 26, 27, 28) and the cylinder rod pin at the base (Figure 15; Items 21, 22, 23) and hoses.
5. Clamp the cylinder assembly in a vise.
6. Figure #8 shows the sectional view of the hydraulic cylinder. Replace seals accordingly.
7. Mount the cylinders back in position by installing item 28 (Figure 15). The mounting hardware should be left slightly loose.
8. Extend the piston rod and install the cylinder rod pin, washer and retaining ring (Figure 15; Items 21, 22, 23).
9. Raise and lower the platform, after removing the maintenance safety angle, so that the cylinder aligns itself. Now, tighten the cylinder mounting plate bolts (Figure 15; Item 25).

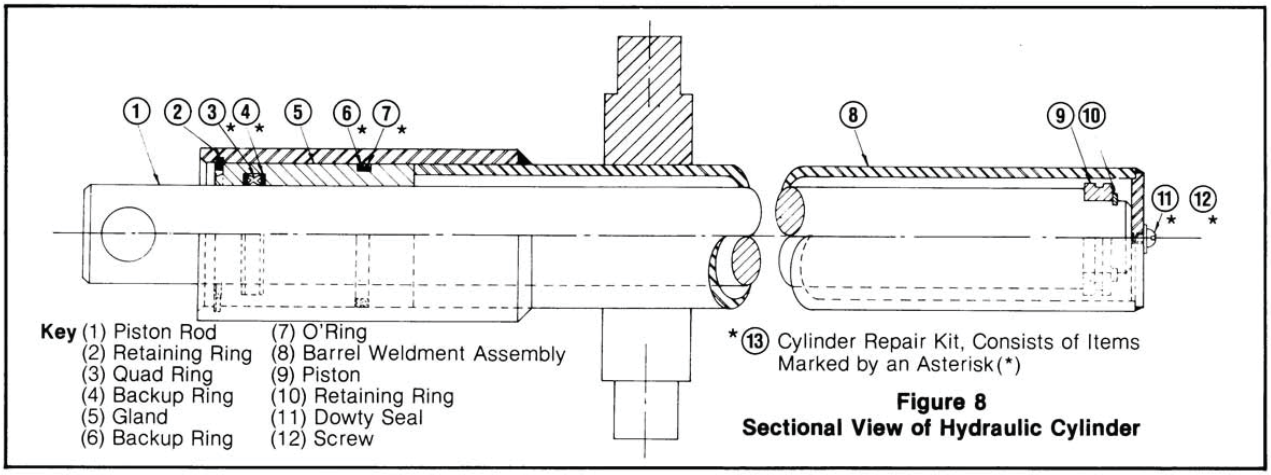


Figure 8
Sectional View of Hydraulic Cylinder

Electrical Components

Given below are the various electrical components used on the Lift. A brief explanation of each is also given.

1. Control Box

The control box comes pre-wired from the factory.
Specifications: Magnetic Starter- 24 V. AC Coil
Thermal overload-3 pole.
Adjustable Transformer-*
Primary: 208/240/277/380/480V,50/60Hz
Secondary: 24V,0.100kVA
Fuse in Secondary Circuit-4AMP
Reset-Automatic or Manual.
Enclosure-NEMA 12 with 5 knockouts (Motor, Solenoid, Limit Switch, Push Button Control and Power Cord).
Overall Box Dimensions: 12"x10"x5"

*In the case of a single phase unit, the Adjustable Transformer has a primary voltage of 115/230V, 60 Hz and a secondary voltage of 24V, 0.100 KVA.

The control box is prewired for the power supply you have ordered. In case it becomes necessary to convert from high to low voltage or vice versa, reconnect the wires per diagram on the motor and transformer. Also, change overload protection to the proper value per motor chart (see below).

2. Electric Motor

Install the power lines to conform to National Electrical Code (NEC) 430-22 and the local codes. For reference, the motor currents are listed below.

1-1/2 HP,208/230/460V, 3 Phase, 60 Hertz, 3450 RPM, 2 minute intermittent duty, TENV. Super Torque Motor.

VOLTAGE	208	230	460
Full Load Current, Amps	5.3	4.8	2.4

(b)1-1/2 HP, 115/230V, 1 Phase, 6 Hertz, 3450 RPM, 2 minute intermittent duty, TENV. Super Torque Motor.

VOLTAGE	115	230
Full Load Current, Amps	23	11.5

To reverse the direction of rotation of a 3 phase motor, reverse any two of the 3 power leads to the motor. On single phase motors, see wiring diagram on motor. In case wiring is done in the field, connect the motor per wiring diagram drawn on the motor name plate, or as shown in Fig. 9 and 10.

Recommended Motor Lubrication:
Lubricant: Consistency #3 (Cyprina #3) or comparable
Lithium Grease.
Intermittent Duty and
Normal Continuous Duty grease once a year.
High Ambient, moist or dirty
Continuous Duty . . . . . grease twice a year.

3. Push Button Control Station

The standard push button control station supplied with the Lift is weatherproof pendent with "UP" and "DN" momentary contact, dead-man type push button. There is a mechanical interlock provided internally i.e. when one button is depressed the other is mechanically held open.

4. Down Solenoid

The cartridge type, Down Solenoid valve, discussed in the Hydraulic Section uses a 24V, 60Hz coil, requiring 40VA. Removal of coil is accomplished by removal of the top nut, without disturbing the hydraulic system. (See Figure 7 for details.)

5. Twist Lock Plug.

The twist lock plug supplied with the 15 foot power cord on the unit conforms to the following specifications. Customer to supply or make provisions for mating receptacles.

Power Supply	NEMA Configuration of Twist Lock Plug (by ECOA)	NEMA Configuration of Mating Receptacle (by Purchaser)
208-230V/3PH/60Hz	L15-2-P	L15-20R
460V/3PH/60Hz	L16-20P	L16-20R
115V/1PH/60Hz	L 5-30P	L 5-30R
230V/1PH/60Hz	L 6-15P	L 6-15R

6. Wiring Diagram.

The standard power units come prewired for 1-1/2 HP,230V/1 PH/60Hz power supply, unless otherwise stated in the order. The wiring diagram for the standard and the more common options is shown in the figures 9A, 9B, 10A, 10B and 11. A Diagram for the High or Low voltage connections on the motor and the transformer for three and single phase power supply, is also shown, which will facilitate field conversions.
The Diagrams are self explanatory.

7. Wiring Size.

The standard 1-1/2 HP Power Unit uses an intermittent duty rated supertorque motor. A supertorque motor has the capabilities of producing torque greater than twice the nameplate rating "on-demand" for short periods of time. **Thus, it should be noted that ampere ratings mentioned under "Electric Motors" is for full load torque. Under actual conditions, the motors will draw higher current.** As a guide, the following chart should be used for determining wire size of either the extension cord or the internal wiring for the power outlet at the customer's plant.

(a) 3 Phase Motors:

Voltage	Wire Size	For Lengths Up to
(i) 208-230V	#14 guage	75 feet
	#12 guage	150 feet
(ii) 460V	#14 guage	175 feet

(b) 1 Phase Motors:

Voltage	Wire Size	for Lengths Up to
(i) 115V	#14 guage	75 feet
	#8 guage	85 feet
	#6 guage	130 feet
(ii) 230V	#12 guage	75 feet
	#10 guage	115 feet
	#8 guage	175 feet

Note:

1. For 115V/1PH/60Hz, Power Supply.
   For proper operation, it is necessary to provide a separate 30 AMP circuit and adequate sized wiring to assure an actual 115 volts at the power cord plug during full load operation. Improperly sized wiring at the customer plant will lead to overheating of motors and constant overload tripping due to high ampere draw.
2. The standard 1-1/2 HP power unit uses an intermittent duty rated super torque motor. Make sure that frequency of operation does not exceed one full lift every 4 minutes. This is to avoid overheating of motors. Please note that motor operates only on "UP" cycle. "DOWN" cycle is by gravity. In high frequency operations or faster speeds consult factory for use of power units with continuous duty rated motors.

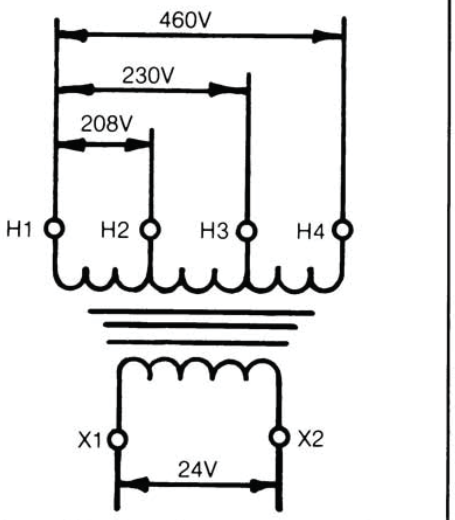


Figure 9A: Transformer Connections on 3 Phase Power Supply.

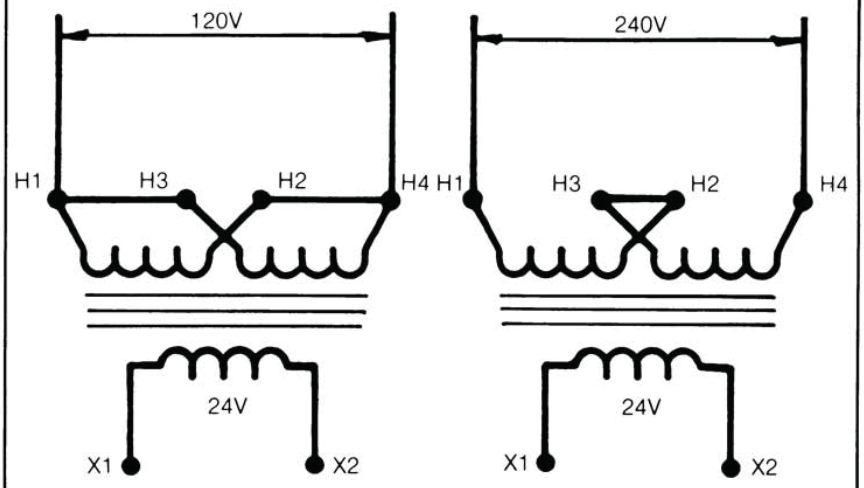


Figure 10A: Transformer Connections on 1 Phase Power Supply

Note: To Reverse the Rotation of a Three Phase Motor, Interchange any 2 of the 3 power leads to the motor.

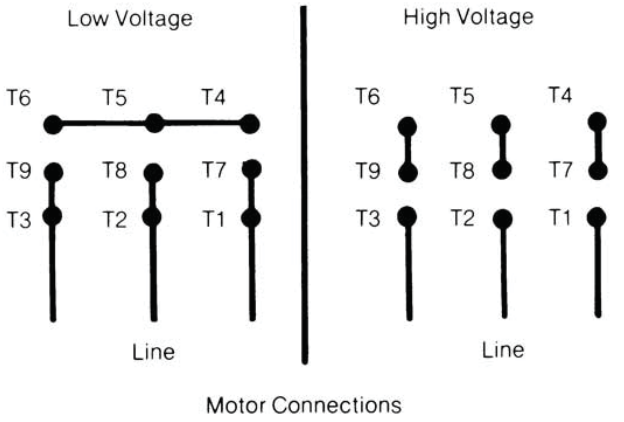
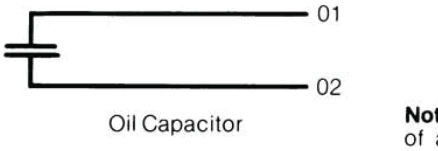
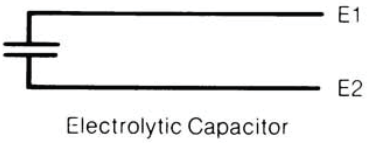


Figure 9B: 3 Phase Motor Connections.



Note: To Reverse the Rotation of a Single Phase Motor, Interchange **#5 and #6.**



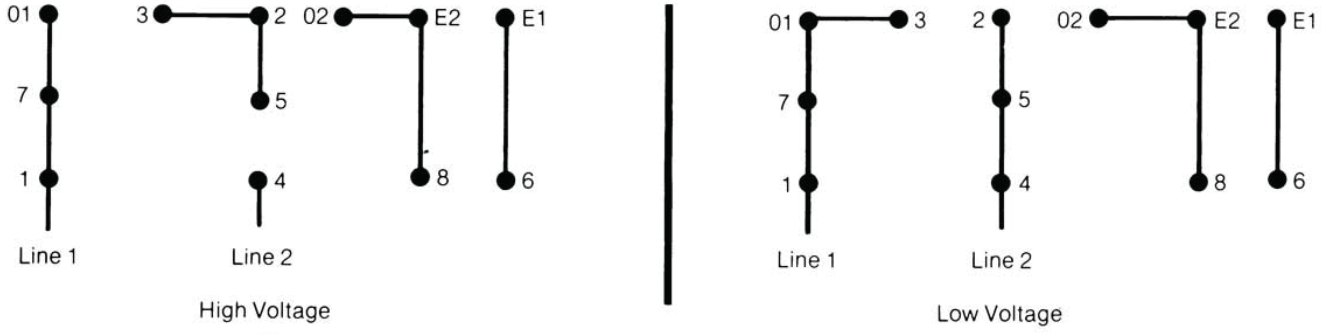
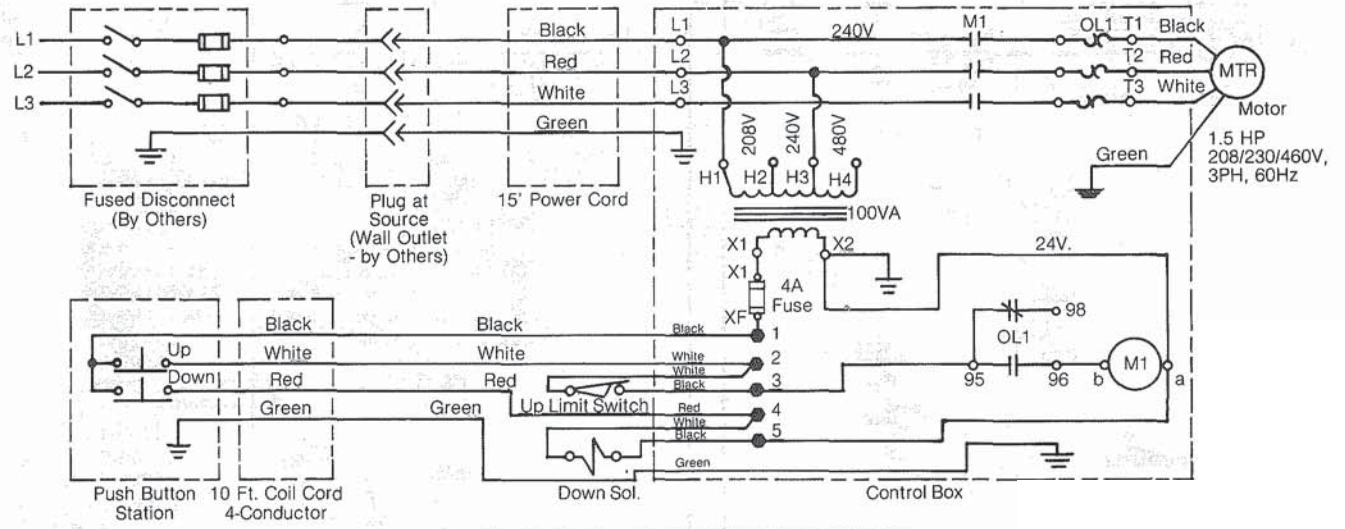
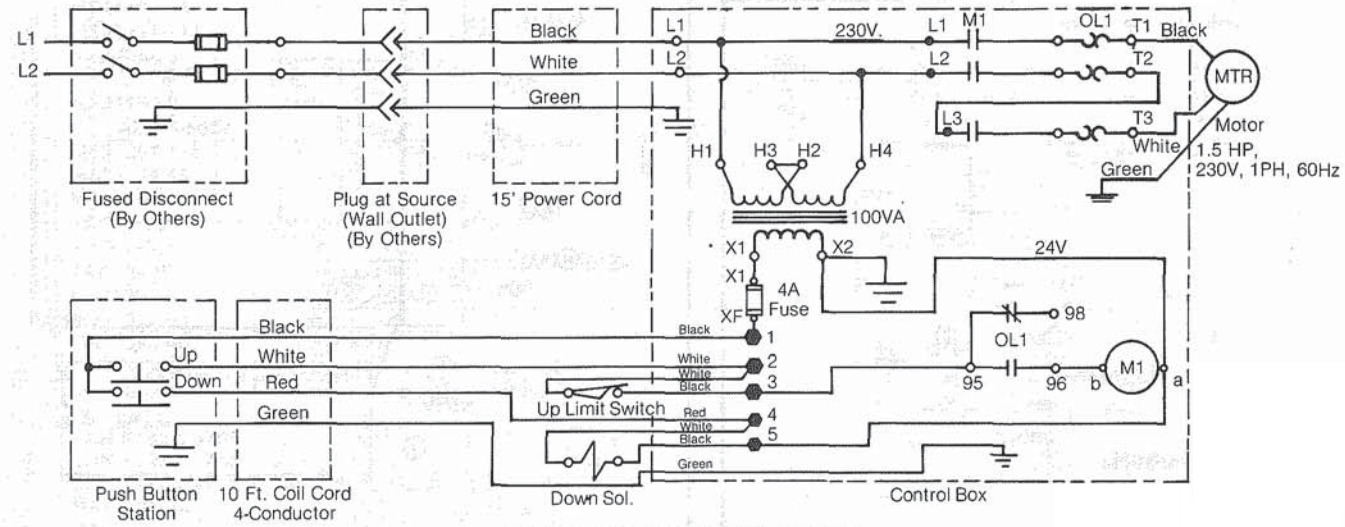


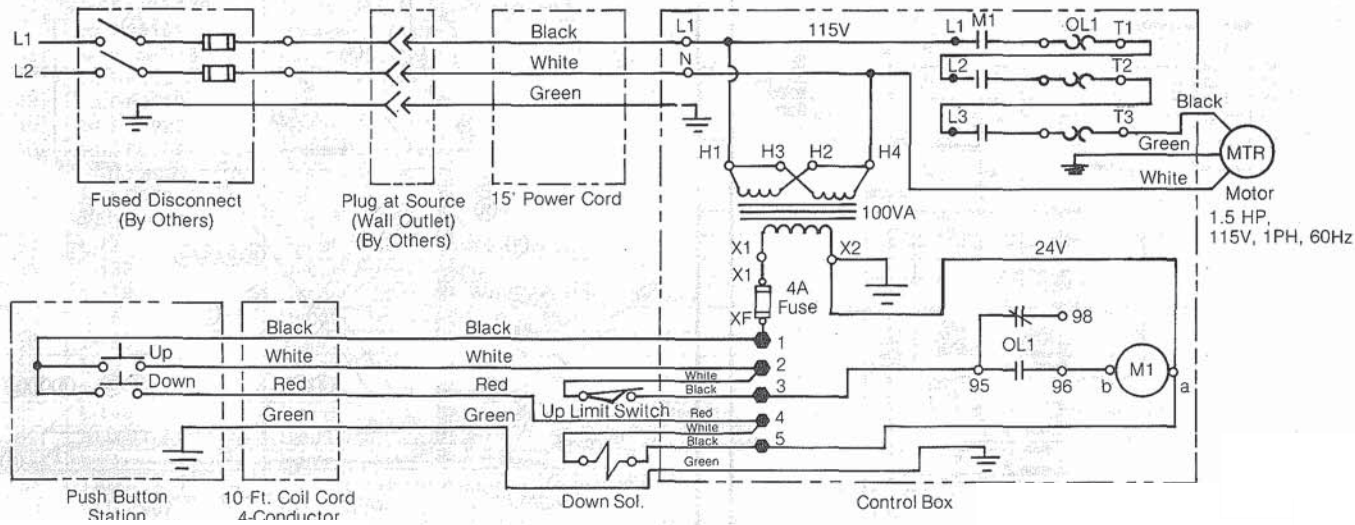
Figure 10B: Motor Connections for 1½ HP/1PH/60Hz Electric Motor.



Electrical Schematic For 208/230/460V, 3PH, 60Hz



Electrical Schematic For 230V, 1PH, 60Hz



Electrical Schematic For 115V, 1PH, 60Hz

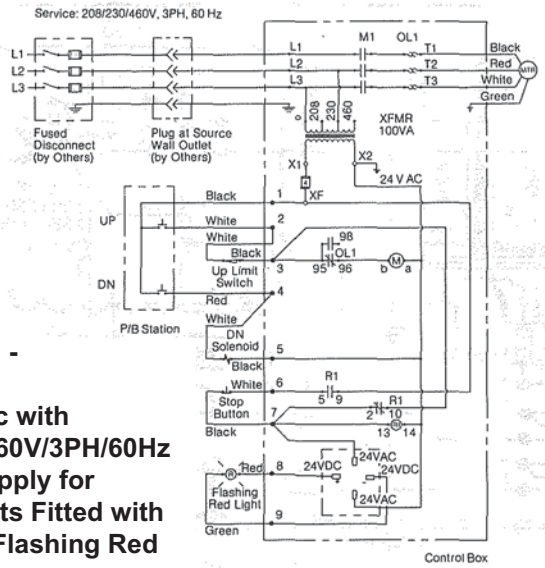


Figure 12 - Electrical Schematic with 208/230/460V/3PH/60Hz Power Supply for BTAD Units Fitted with Optional Flashing Red Lights.

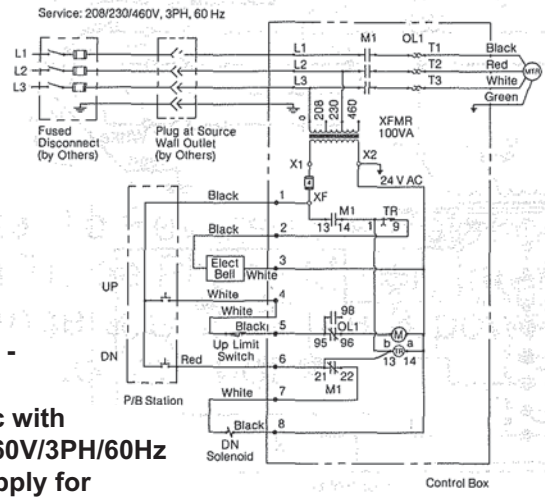


Figure 13 - Electrical Schematic with 208/230/460V/3PH/60Hz Power Supply for BTAD Units Fitted with Optional Warning Bell.

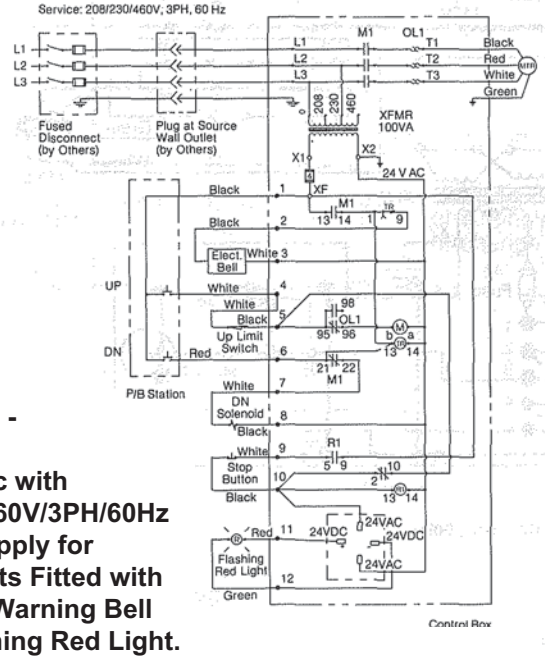


Figure 14 - Electrical Schematic with 208/230/460V/3PH/60Hz Power Supply for BTAD Units Fitted with Optional Warning Bell And Flashing Red Light.

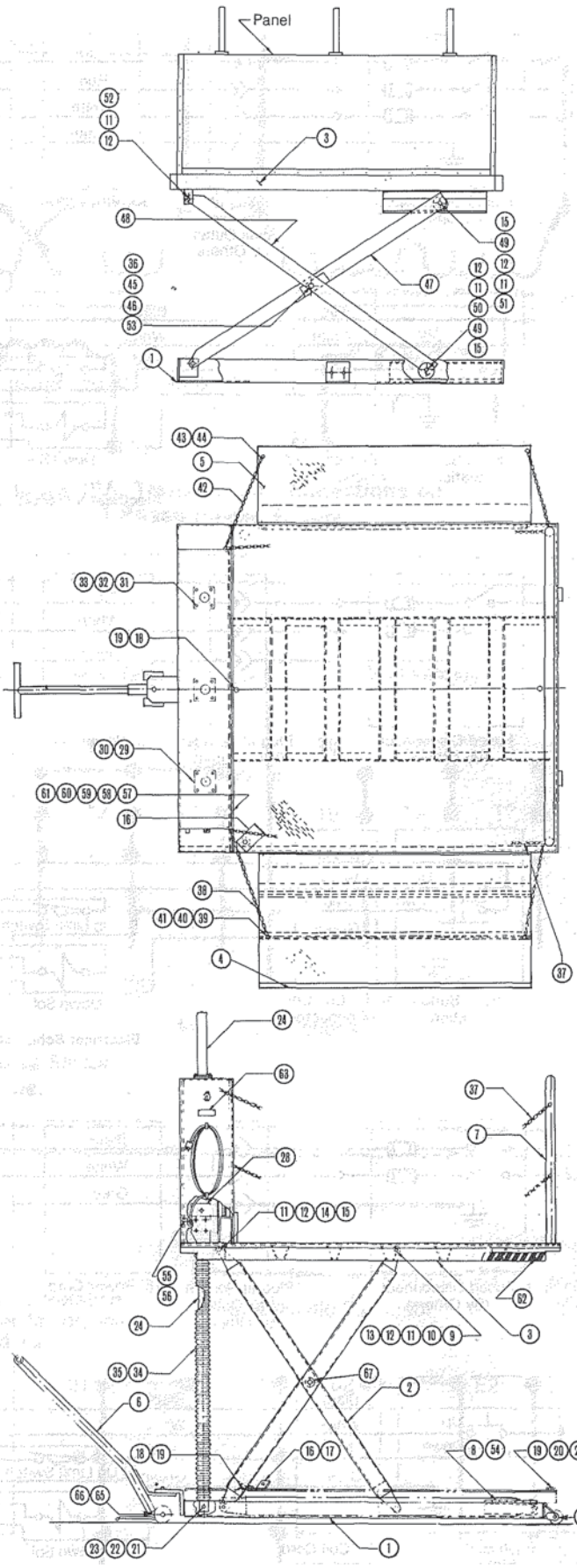


Figure 15 - General Layout of BTAD Series Third Scissor Leg Details (For Model BTAD-xx-806 ONLY) (View from Dolly Jack End)

Figure 15 General Layout of BTAD Series

Item No.	Part Number	Description	Qty. Required		
			BTAD-XX-606	BTAD-XX-608	BTAD-XX-806
1	**	Base Frame Assembly (includes #64)	1	1	1
2	**	Leg Set Assembly (includes #67 thru 71)	1	1	1
3	* *	Platform Assembly	1	1	1
4	**BHLD-P533-30060**	Standard Steel Ramp Assembly 30 x 60	1	1	1
	BTAD-P5201	Optional Aluminum Ramp Assembly 30 x 60	1	1	1
5	**HLD-P533-18060**	Standard Steel Bridge Assembly 18 x 60	1	1	1
	BTAD-P5001	Optional Aluminum Bridge Assembly 18 x 60	1	1	1
6	**BTAD-P1751**	Dolly Jack - Standard (includes #65 and 66)	1	1	1
	BTAD-P1758	Dolly Jack with Tow Bar (Optional Equipment) (incl. #65 & 66)	1	1	1
7	**BTAD-P4101-48S**	Handrail Assembly - 44” c/c	-	-	-
	BTAD-P4101-72S	Handrail Assembly - 68” c/c	1	1	-
	BTAD-P410196S	Handrail Assembly - 92” c/c	-	-	1
8	**BTAD-P1401**	Safety Maintenance Angles	2	2	2
9	**BHLD-P932**	Rollers	4	4	4
10	**BHLD-P913**	Roller Pins	4	4	4
11	**BHLT-P950**	Bearings	16	16	23
12	**BHLT-P972**	Retaining Rings	16	16	23
13	**BTAD-P9303**	Spacers	8	-	8
	BHLD-P996	Spacers		8	-
14	**BTAD-P9003**	Clevis Pin Weldment	4	4	4
15	**BHLT-P970**	Washers	4	4	10
16	**BHLD-P994**	Lifting Eyes	4	4	4
17	**BMS35291-199**	3/4 UNC x 5” Lg. HHMB	4	4	4
18	**BMS35291-119**	1/2 UNC x 3” Lg HHMB	1	1	1
19	**BMS27183-18**	1/2” Washer	2	2	2
20	**BMS35291-113**	1/2 UNC x 11/2 Lg. HHMB	1	1	1
21	**BTAD-P9005**	Cylinder Mounting Pin	2	3	3
22	**BWFC-P108**	Retaining Ring	4	6	6
23	**BMS27183-27**	Washer	4	6	6
24	**BCYL-A2805-5650**	Cylinder Assembly (Includes Item Nos. 125 through 136)	2	3	3
25	**BMS35291-116**	1/2-13 UNC HHMB x 21/4 Lg.	16	24	24
26	**BMS35338-48**	1/2” Washer	16	24	24
27	**BMS35690-802**	1/2-13 UNC Hex Nuts	17	25	25
28	**BTAD-P9301**	Cylinder Mounting Plate	4	6	6
29	**BTAD-P9306**	Cylinder Gasket	2	3	3
30	**BTAD-P9307**	Cylinder Gasket Plate	2	3	3
31	**BMS35291-8**	1/4-20 UNC HHMB x 1” Lg.	8	12	12
32	**BMS35338-44**	1/4 LW	8	12	12
33	**BMS35690-402**	1/4-20 UNC Hex Nut	8	12	12
34	**BTAD-P9305**	Cylinder Bellows (Optional Equipment Only)	2	3	3
35	**BMS35842-14**	Bellows Clamps (Optional Equipment Only)	2	3	3
36	**BHLT-P971**	Washer	-	-	3
37	**BCHN-P192-5.67SH**	Safety Chain, 68” Lg. W/1 Snap-hook	4	-	4
	BCHN-P192-7.67SH	Safety Chain, 92” Lg. W/1 Snap-hook	-	4	-
38	**BCHN-P192-4.67**	Ramp Plate Mounting Chain 56” Lg.	2	2	2
39	**BMS35291-36**	3/4s”-18 UNC x 11/4 Lg. HHMB	2	2	2
40	**BMS27183-12**	5/16” Flat Washer	4	4	4
41	**BMS35690-502**	Vie”-18 UNC Hex Nut	2	2	2
42	**BCHN-P192-4.17**	Bridge Plate Mounting Chain 50” Lg.	2	2	2
43	**BMS35239-119**	1/4”-16 UNC x 11/4” Lg. Screw F/H	2	2	2
44	**BMS51922-170**	3/4”-16 UNC Nut-Lock Dimpled	2	2	2
45	**BHLT-P9101**	Retaining Washer	-	-	1
46	**BMS24667-76**	Flat Hd. Screw (1/2”-13 UNC x 11/2 Lg.)	-	-	1
47	**BHLT-P320-1**	Leg Assembly	-	-	1
48	**BHLT-P2010**	Leg	-	-	1
49	**BHLT-P9020**	Roller	-	-	2
50	**BHLT-P9007**	Roller Pin	-	-	1
51	**BTAD-P9021**	Roller Pin	-	-	1
52	**BHLT-P9006**	Pin	-	-	1
53	**BTAD-P9020**	Axle Pin Assembly	-	-	1
54	**BL-121**	Decal “Maintenance Safety Bar”	4	4	4
55	**BL-132**	Decal - Power Supply	2	2	2
56	**BL-129**	Decal “CAUTION - WIRING” (for 115V only)	1	1	1
57	**BL-96**	Decal - “Remove Shipping Bolts”	3	3	3
58	**BL-155**	ECOA Logo	2	2	2
59	**BL-73**	Decal “Danger – Keep-out”	4	4	4
60	**BL-97**	Decal “Lifting Cap”	2	2	2
61	**BL-140**	Decal “Caution - All Loads must Be Centered”	2	2	2
62	**BHLD-ST-2**	Black and Yellow Safety Stripe (min. 22’, max. 26’)	AR	AR	AR
63	**L-71**	Name Plate	1	1	1
64	**BTAD-P1671**	Transport Roller Assembly (Reference)	2	2	2
65	**BHLD-P907**	Axle Pin (Reference)	1	1	1
66	**BCAS-WA-PY6**	Caster Assembly - 6” Diameter Poly (Reference)	2	2	2
67	**BTAD-P9010**	Axle Pin (Reference)	2	2	2
68	**BHLT-P953**	Bushing (Reference)	8	8	8
69	**BDSL-P9064**	Retainer Washer (Reference)	2	2	2
70	**BHLT-P971**	Flat Washer (Reference)	4	4	4
71	**BMS24667-76**	Hex Soc. F/H Screw (Reference)	2	2	2

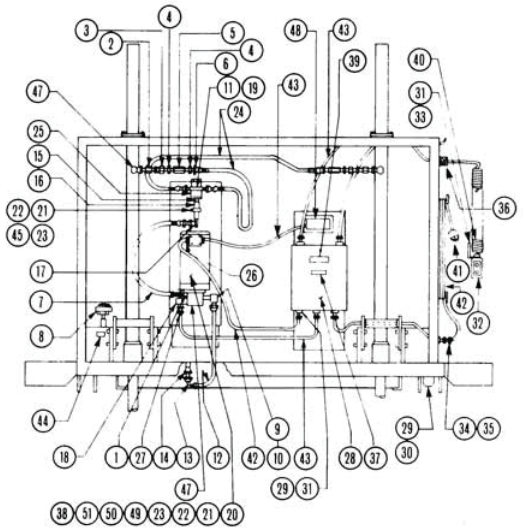


Figure 16A - General Layout of Power Unit for 2 Cylinder Models.

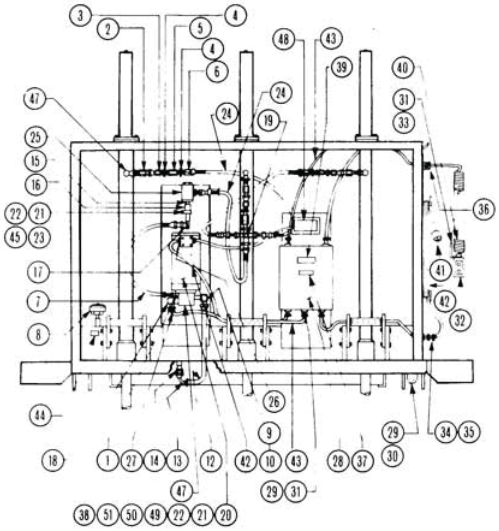


Figure 16B - General Layout of Power Unit for 3 Cylinder Models

Trans-A-Dok™ Parts List

Item No.	Part Number	Description	Quality Required TAD-XX-606	TAD-XX-608	TAD-XX-806
1.	**BHOS-P413-37**	Adapter	1	1	1
2.	**BHLD-P721**	Velocity Fuse	2	3	3
3.	**BHOS-P412-02**	Adapter	2	3	3
4.	**BHOS-P401-03**	Reducer	4	6	6
5.	**BTAD-P7101**	Flow Control Valve	2	3	3
6.	**BHOS-P402-03**	Coupling	2	2	2
7.	**BHOS-P109-0220**	Hose Assembly A NPT x 22" Long	1	1	1
8.	**BHYD-41-03**	Breather Filter	1	1	1
9.	**BHOS-P422-15**	Elbow	1	1	1
10.	**BHOS-P350-08-08**	Hose Fitting - Straight	1	1	1
11.	**BHOS-P404-05**	Nipple 3/8 NPT	1	-	-
12.	**BHOS-P201-08-180**	Suction Hose 1/2" I/D x 18" Lg.	1	1	1
13.	**BHOS-P351-08-08**	Elbow Fitting	1	1	1
14.	**BHYD-43-02**	Suction Filter	1	1	1
15.	**BHOS-P404-05**	Nipple 3/4"	1	1	1
16.	**BHLD-P720**	Flow Control Valve 3.0 GPM	1	1	1
17.	**BHOS-P419-01**	Elbow	1	1	1
18.	**BHLD-P719**	Solenoid Valve (Ref.) (Part of Item 83)	1	1	1
19.	**HOS-P430-03**	Tee 3/4 NPT	1	-	-
	HOS-P434-03	Cross 3/4 NPT	-	1	1
20.	**BELC-P126-09**	Electric Motor 11/2HP	1	1	1
		230/115V,1 PH/60Hz	1	1	1
	BELC-P126-07	Electric Motor 11/2			
		HP,208/230/460V,3PH/60Hz	1	1	1
21.	**BMS35291-6**	1/4-20 UNC HHMB x 3/4 Lg.	9	9	9
22.	**BMS35338-44**	A 0 LW	9	9	9
23.	**BMS35690-402**	1/4-20 UNC Hex Nut	9	9	9
24.	**BHOS-P107-0340**	Hose Assembly 3/8 NPT x 34" Long	2	3	3
25.	**BHYD-44-02**	Filter	1	1	1
26.	**BELC-P105-10**	Cable Connector			
		(3 0 Power Supply)	1	1	1
	BELC-P105-15	Cable Connector			
		(1 0 Power Supply)	1	1	1
27.	**BELC-P105-14**	1/2" Cable Connector	1	1	1
28.	**BELC-P115-12**	Control Box 230V/1PH/60Hz	1	1	1
	BELC-P115-11	Control Box 115V/1PH/60Hz	1	1	1
	BELC-P115-09	Control Box 208-230V/3PH/60Hz	1	1	1
	BELC-P115-10	Control Box 460V/3PH/60Hz	1	1	1
29.	**BELC-P105-14**	1/2" Cable Connector	6	6	6
30.	**ELC-P109-01**	Limit Switch	1	1	1

Item No.	Part Number	Description	Quality Required TAD-XX-606	TAD-XX-608	TAD-XX-806
31.	**BELC-P105-24**	Lock Nut - 1/2"	4	4	4
32.	**BELC-P107-02**	Push Button Station	1	1	1
33.	**BTAD-P9308**	Aluminum Bracket	1	1	1
34.	**BELC-P105-15**	Cable Connector 3/4" Hub			
		(for 1 0 only)	3	3	3
	BELC-P105-10	Cable Connector 3/4" Hub			
		(for 3 0 only)	3	3	3
35.	**BELC-P105-22**	3/4" Nut	4	4	4
36.	**BELC-P105-14**	Cable Connector	1	1	1
37.	**BL-134**	Decal - 460V/3PH/60Hz	2	2	2
	BL-133	Decal - 230V/3PH/60Hz	2	2	2
	BL-137	Decal - 208V/3PH/60Hz	2	2	2
	BL-136	Decal - 230V/1PH/60Hz	2	2	2
	BL-135	Decal - 115V/1PH/60Hz	2	2	2
38.	**BELC-P03-5-10-10**	Fork Connector	6	6	6
39.	**BL-132**	Decal - Lower Supply	1	1	1
40.	**BELC-P112-04**	Coil Cord #16-4 AWG, 10' Ext.	1	1	1
41.	**BELC-P101-06**	Twist Lock Plug; for 230V/1 PH/60Hz only (L6-15P)	1	1	1
	BELC-P101-07	Twist Lock Plug; for 115V/3PH/60Hz only (L5-30P)	1	1	1
	BELC-P101-08	Twist Lock Plug; for 208-230V /3PH/60Hz only (L15-20P)	1	1	1
	BELC-P101-03	Twist Lock Plug; for 460V/3PH/60Hz only (L16-20P)	1	1	1
42.	**999-6033**	Power Cord & Motor Leads #10 AWG-3 Type SO Cord x 280" Lg (Single Phase P/U only)	1	1	1
	999-6002	Power Cord & Motor Leads #14-4 Type SO Cord x 280"Lg (3 Phase P/U only)	1	1	1
43.	**999-6004**	Solenoid & Limit Switch Leads #16-2 "SO" Cord. x 15' Lg.	1	1	1
44.	**BL-130**	Decal - Oil	1	1	1
45.	**BHLD-P988**	Hose Clip Gear Pump, 2 gpm @ 3600 RPM	1	1	1
46.	**BHLT-P709**	(includes item 54, 120 thru 124, 138 thru 147)	1	1	1
47.	**BHOS-P418-06**	Elbow	2	3	3
48.	**BELC-P05-4-14-250**	90° Connector (for single phase capacitor only)	2	2	2
49.	**999-6007**	Spring Connector (Red)	2	2	2
50.	**999-6006**	Spring Connector (Yellow)	4	4	4
51.	**BELC-P06-16-14**	Butt Connector (1 0 only)	2	2	2
		Butt Connector (3 0 only)	4	4	4

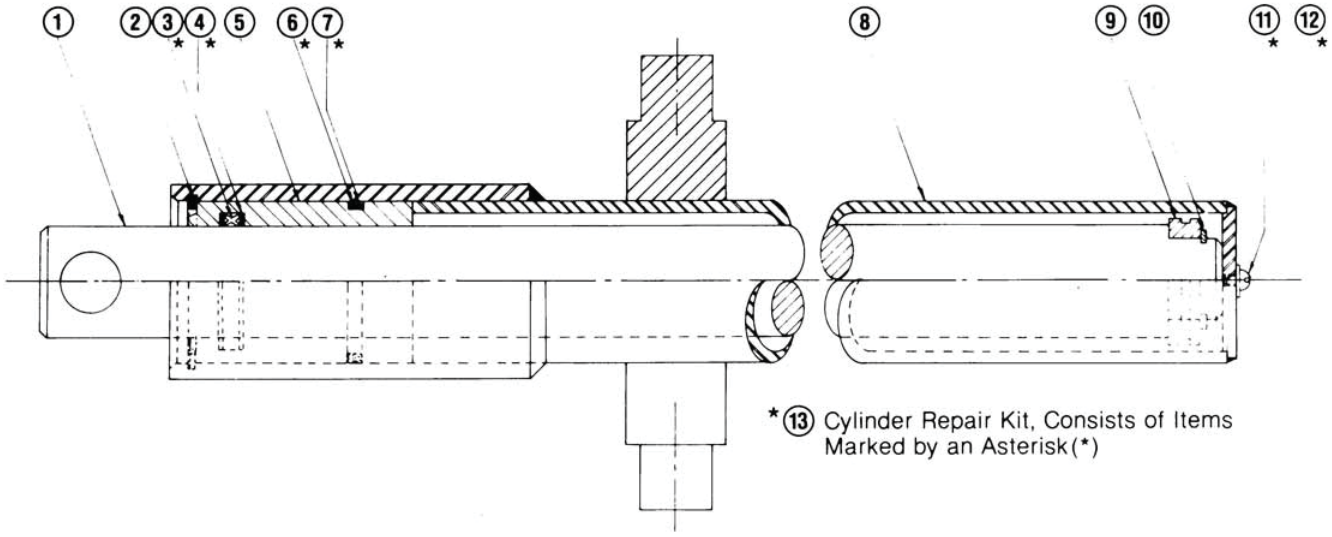


Figure 17 - Sectional View of Hydraulic Cylinder Assembly CYL-A2805-5650

Item	Part Number	Description	Qty.
1.	CYL-R2803-6350	Piston Rod	1
2.	CYL-M0025-041	Retainer Ring	1
3.	CYL-M0002-327	Quad Ring	1
4.	CYL-M0007-327	Back-Up Rings	2
5.	CYL-G0002	Gland	1
6.	CYL-M0006-228	Back-Up Ring	1
7.	CYL-M0001-228	0' Ring	1
8.	CYL-B3405-6138	Barrel Assembly Weldment	1
9.	CYL-P0001	Piston	1
10.	MS3217-1137	Retaining Ring	1
11.	HYD-31-16	Dowty Seal	1
12.	HDW-P9-0406	Button Head Screw	1
13.	CYL-A2801-RK	Cyl. Repair Kit (Consists of items 3, 4, 6, 7, 11 & 12)	1

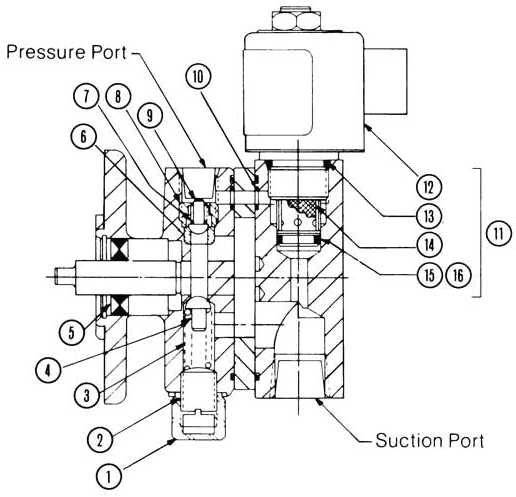


Figure 18 - Cross-Sectional View of Hydraulic Pump with Internal Valves used on 1½ HP Power Units.

Item	Part Number	Description	Qty.
1.	BHLD-P709-3	Cap Valve	1
2.	BHLT-P709-2	Screw	1
3.	BHLT-P709-1	Relief Valve Compression Spring	1
4.	BHLT-P709-4	Plug	1
5.	BHLT-P709-5	Seal	1
6.	BHLT-P709-10	Check Valve Seat	1
7.	BHLT-P709-11	Check Valve Spring	1
8.	BHLT-P709-12	Check Valve Screwbody	1
9.	BHLT-P709-13	Check Valve Plug	1
10.	BHLT-709-14	O'Ring	1
11.	BHLD-P719	24VAC Solenoid Valve Assembly (Consists of items 12 through 16)	2
12.	BHLD-P719-1	Solenoid Coil - 24VAC	1
13.	BMS3393-10	O'Ring	1
14.	BHYD-44-01	Pressure Line Filter	1
15.	CYL-M0001-014	O'Ring	1
16.	CYL-M0006-014	Back up Ring	1

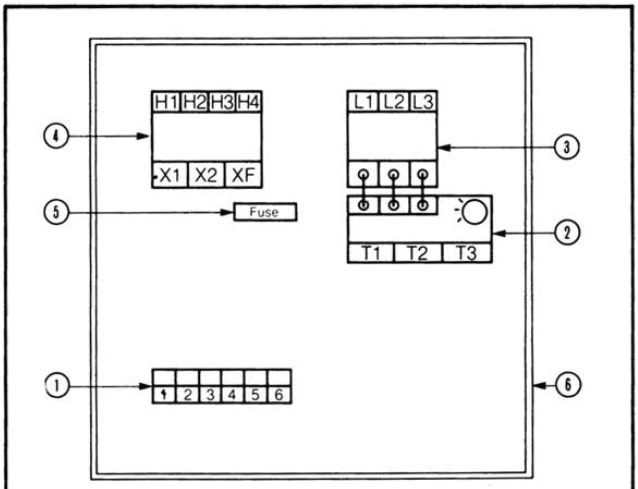


Figure 19A
Details of Standard
Electrical Control Box
Assembly for UP/DN Circuits.

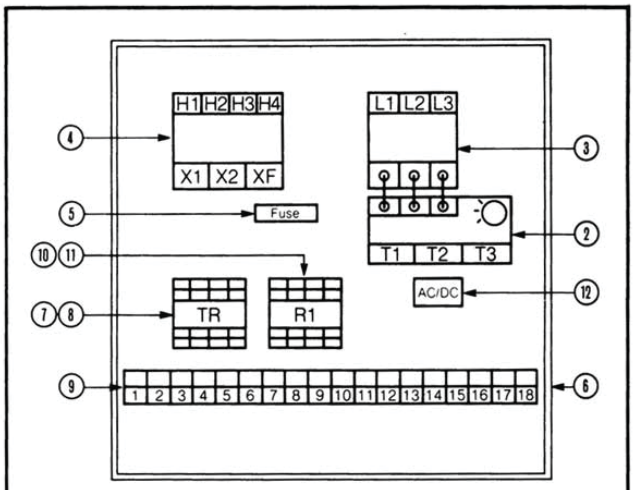


Figure 19B - Details of Optional
Electrical Control Box
for Units Fitted with
Warning Bell and Flashing Red Light

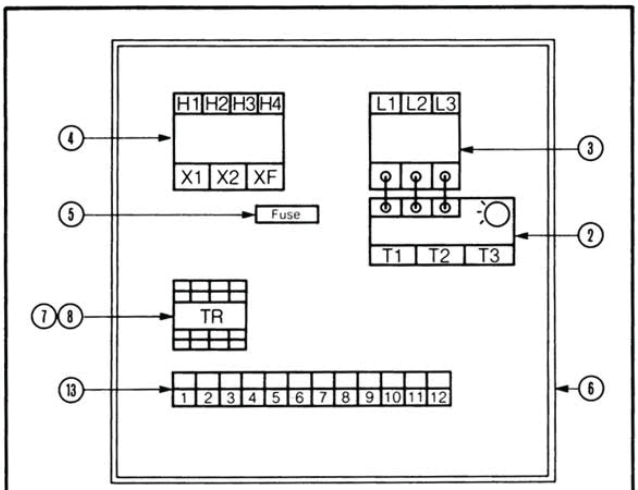


Figure 19C - Details of Optional Electrical
Control Box for Units Fitted with Warning Bell.
(Bell to Sound 2 Seconds on Start of
''UP'' and ''Down'' Cycles)

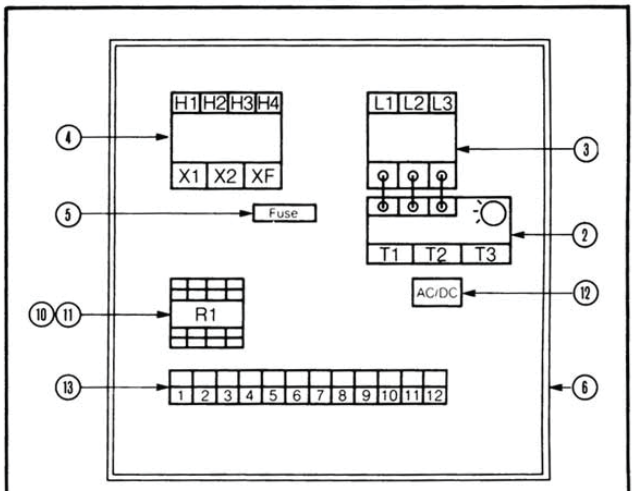


Figure 19D
Details of Optional Electrical Control
Box for Units Fitted with
Flashing Red Light

Item No.	Part Number	Description	Qty.
1.	ELC-P119-01	Terminal Block	1
2.	ELC-P118-02	Thermal Overload; 11.5AMP (115V/1PH/60Hz)	1
	ELC-P118-03	Thermal Overload; 23AMP (230V/1PH/60Hz)	1
	ELC-P118-04	Thermal Overload; 6.5AMP (208-230V/3PH/60Hz)	
	ELC-P118-05	Thermal Overload; 2.1 AMP (460V/3PH/60Hz)	1
3.	ELC-P117-01	Motor Starter, 24VAC Coil, size 0	1
4.	ELC-P116-01	Transformer (Prim: 208,230,460V) (Secn: 24VAC)	1
	ELC-P116-02	Transformer (Prim: 115/230V) (Secn: 24VAC)	1
5.	ELC-P122-01	Fuse, Control Circuit, 4AMP	1
6.	ELC-P103-06	Enclosure, NEMA 12, 12”x10”x5”	1
7.	ELC-P120-01	0-10 Sec Adjustable Time Delay Relay	1
8.	ELC-P120-04	Base Socket for Relay	1
9.	ELC-P119-01	Terminal Block	3
10.	ELC-P120-02	24 VAC Relay	1
11.	ELC-P120-04	Base Socket for Relays	1
12.	ELC-P128-01	Rectifier 24 VAC/24 VDC	1
13.	ELC-P119-01	Terminal Block	2

Trouble Shooting

Observation	Possible Cause	Remedy
1. Lift does not raise but pump is running or humming.	a. Motor rotation may be reversed.	a. See arrow on pump to check correct rotation. Change motor rotation per notes in Electrical Section. If Lift has been running properly for some time, then it is possible that plant wiring has been changed, and the motor is now running reversed.
	b. Motor may be single phasing. (humming)	b. Check wiring and overloads, fuses, etc., to ascertain that all 3 phase lines are present at the motor.
	c. voltage at motor terminals mao be too low to run pump at existing load.	c. Measure voltage at motor terminals, or as near as possible, while pump is running under load. If voltage is sufficient, check for inadequate or incorrect wiring as this can starve the motor. Correct as necessary.
	d. Hose or hydraulic line is leaking.	d. Correct as necessary.
	e. Oil level in resevoir is low.	e. Add oil
	f. Load exceeds capacity requirements. Relief valve is bypassing the oil back into the tank.	f. Do not change Relief Valve setting. Instead, reduce the load to rated capacity.
	g. Suction filter is clogged; starving pump.	g. Remove and clean.
	h. Suction line may be leaking air due to loose fittings.	h. Check fittings.
	i. Filter/Breather cap on tank may be clogged.	i. Remove and clean.
	j. Down Valve may be energized by faulty wiring or stuck open.	j. Remove Solenoid Valve, check and clean. (See Hydraulic Section.)
	k. Hydraulic pump may be inoperative.	k. Disconnect hydraulic line at power unit. Put hose end in a large container and run pump again. If no output, check motor rotation as per 1(a) above. Check also, the pump-motor coupling, which may be defective, and correct as necessary. If pump is worn, replace with a new pump.
2. Lift raises too slowly.	a. Foreign material stuck in Down Solenoid, causing some oil to bypass back into tank.	a. Lower the Lift. Remove the Solenoid Valve and clean it. (See Hydraulic Section.)
	b. Foreign material clogging suction filter, breather cap, pressure line filter, or a pinched hose.	b. Correct as necessary. (See also 1(g), (i).)
	c. Low Motor voltage.	c. See 1(c).
	d. Lift overloaded.	d. See 1(f).
	e. Oil is too thick for proper operation.	e. Refer to “Oil Viscosity Recommendations”.
	f. Lift operates with a shuddering vibration.	f. Cylinder may be binding. Align correctly.
	g. Pump is inoperative	g. See 1(k).
3. Motor labors or heats excessively.	a. Voltage may be low.	a. Lower the Lift. Remove the Solenoid Valve and clean it. (See Hydraulic Section.)
	b. Incorrect wiring.	b. Correct as necessary. (See also 1(g), (i).)
	c. Oil starvation causes pump to bind. High internal heat is developed if this occurs, pump may be permanently damaged.	c. See 1(c).
	d. Binding cylinders.	d. See 1(f).
	e. Oil may be too thick.	e. Refer to “Oil Viscosity Recommendations”.

Trouble Shooting

Observation	Possible Cause	Remedy
4. "Spongy" or "Jerky" Lift operation. Do not a. Air trapped in cylinders. confuse spongy operation with small surges caused by foreign material on Lift wheel roller plate.	a. Air trapped cylinders.	a. Bleed cylinders by lowering Lift fully and hold "DN" button for 20-30 seconds more. Raise Lift and repeat procedure several times. Bleed cylinders also, by loosening bleeder screws until a steady stream of oil comes out.
	b. Oil starvation.	b. See 1(e), (g), (h), (i)
5. Lift lowers too slowly when loaded.	a. Down Valve filter clogged.	a. Remove Solenoid Valve and clean filter.
	b. Pinched tube or hose.	b. Correct as necessary. (In case of pipe, check for obstruction in line.)
	c. Oil too thick.	c. See "Oil Viscosity Recommendations" for your ambient temperatures.
	d. Foreign material in Flow Control Valve.	d. Lower the Lift, remove Flow Control Valve and clean. (See Hydraulic Section.)
	e. Binding cylinders.	e. See 2(f).
	f. Foreign material in Velocity Fuse.	f. Remove and clean.
6. Lift lowers too quickly.	a. Leaking hoses, cracked fittings.	a. Correct as necessary.
	b. Check valve stuck open. (The combination of a stuck Check Valve and open Solenoid Valve will cause excessive speeds.	b. Remove Check Valve and clean it. (See Hydraulic Section)
	c. Foreign material stuck in Flow Control Valve. (In this case, Lift lowers initially at a normal rate then speeds up as the platform descends.)	c. Remove Flow Control Valve and clean it.
7. Lift raises then lowers slowly.	a. Down Solenoid Valve may be incorrectly wired or is stuck open due to dirt.	a. See 2(a).
	b. Check Valve may be stuck open.	b. Remove and clean. (See Hydraulic Section.)
	c. Check for leaking hoses, fittings, pipes.	c. Correct as necessary.
	d. Cylinder packings may be worn or damaged.	d. Replace packings. (See Cylinder Repair procedure.)
8. Lift has raised, but does not lower.	a. Blown electrical fuse.	a. Check and replace.
	b. Incorrect Down Solenoid Valve wiring.	b. Correct as necessary. (See Wiring Diagram.)
	c. Down Solenoid Valve is stuck.	c. Lightly tap down the Solenoid Coil body to seat it properly. **(Do not hit hard as it will permanently damage the internal stem.) Do not remove the Solenoid Valve from the Pump Body as the unit will come down at a dangerous speed.**
	d. Faulty Down Solenoid Coil.	d. Remove and replace.
	e. Maintenance safety bar, or some other object blocking down travel.	e. Raise Lift and remove the safety bar, or whatever object is blocking the down travel, then press the down button.
	f. Binding cylinders.	f. See 2(f).
	g. In case of excessive down speeds, the Velocity Fuse will become operative and shut off oil flow from the cylinders, thus the platform will remain stationary.	g. To unlock, repressurize the hydraulic system.
	h. Check if the Limit Switch is inoperative and the platform has raised all the way so that the internal cylinder stops are in operation. If stops are in operation, velocity fuses have been locked up.	h. Put maintenance safety bar in place and unscrew Bleeder plug (Item 136, fig. 8) from cylinder. This will relieve the pressure inside the cylinder. After the platform drops by a few inches reset the Lim. Switch to cut off motor a 60" Raised Height.